

## CLAIMS

1. A method of using PFCs recovered from the effluent of a CVD chamber cleaning process as an influent for the CVD chamber cleaning process, comprising the steps of:

- (a) selecting a first PFC gas mixture having a first ratio of  $C_2F_6$  to  $CF_4$ ;
- (b) providing the first PFC gas mixture as the influent gas to the CVD chamber, wherein the influent gas reacts during the cleaning process to create a CVD chamber effluent gas comprising a second PFC gas mixture having a second ratio of  $C_2F_6$  to  $CF_4$ ;
- (c) adding virgin  $C_2F_6$  or  $CF_4$  to the CVD chamber effluent gas in sufficient quantity to create a third PFC gas mixture having the first ratio of  $C_2F_6$  to  $CF_4$ ;
- (d) using the third PFC gas mixture as the influent gas to the CVD chamber; and
- (e) continuing to add virgin  $C_2F_6$  or  $CF_4$  to the CVD chamber effluent gas to create the third PFC mixture and continuing to use the third PFC gas mixture as the influent gas to the CVD chamber.

2. The method of claim 1, including the step of providing  $O_2$  to the third PFC gas mixture for use as influent gas to the CVD chamber.

3. The method of claim 1, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is less than or equal to the following equation:

$$\frac{(1 - C + (C \cdot U))}{G \cdot C}$$

where U= Utilization of  $CF_4$  in the plasma; G= Generation frequency of  $CF_4$  from  $C_2F_6$ ; and C = Capture efficiency of  $CF_4$ , and the first ratio of  $C_2F_6$  to  $CF_4$  is selected based on the third ratio of  $C_2F_6$  to  $CF_4$ .

4. The method of claim 1, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is less than or equal to about 0.32, and the first ratio of  $C_2F_6$  to  $CF_4$  is selected based on the third ratio of  $C_2F_6$  to  $CF_4$ .

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5. The method of claim 1, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is greater than or equal to 1, and the first ratio of  $C_2F_6$  to  $CF_4$  is selected based on the third ratio of  $C_2F_6$  to  $CF_4$ .

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6. The method of claim 5, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is adjusted by increasing the  $O_2$  concentration.

7. The method of claim 5, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is adjusted by using higher  $C_2F_6$  flowrates.

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8. The method of claim 1, wherein the amount  $CF_4$  in the effluent is less than or equal to the amount of  $CF_4$  in the influent.

9. The method of claim 1, wherein the total gas volume of the effluent is less than or equal to the total gas volume of the influent.

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10. A method of using PFCs recovered from the effluent of a CVD chamber cleaning process as an influent for the CVD chamber cleaning process, comprising the steps of:

(a) selecting a first PFC gas mixture having a first ratio of  $C_2F_6$  to  $CF_4$  greater than or equal to 1;

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(b) providing the first PFC gas mixture as the influent gas to the CVD chamber, wherein the influent gas reacts during the cleaning process to

create a CVD chamber effluent gas comprising a second PFC gas mixture having a second ratio of  $C_2F_6$  to  $CF_4$ ;

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- (c) adding virgin  $C_2F_6$  or  $CF_4$  to the CVD chamber effluent gas in sufficient quantity to create a third PFC gas mixture having the first ratio of  $C_2F_6$  to  $CF_4$ ;
- (d) using the third PFC gas mixture as the influent gas to the CVD chamber; and
- (e) continuing to add virgin  $C_2F_6$  or  $CF_4$  to the CVD chamber effluent gas to create the third PFC mixture and continuing to use the third PFC gas mixture as the influent gas to the CVD chamber.
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11. The method of claim 10, including the step of providing  $O_2$  to the third PFC gas mixture for use as influent gas to the CVD chamber.

15 12. The method of claim 10, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is adjusted by increasing the  $O_2$  concentration.

13. The method of claim 10, wherein the third ratio of  $C_2F_6$  to  $CF_4$  is adjusted by using higher  $C_2F_6$  flowrates.

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14. The method of claim 10, wherein the amount  $CF_4$  in the effluent is less than or equal to the amount of  $CF_4$  in the influent.

15. The method of claim 10, wherein the total gas volume of the effluent is less than or equal to the total gas volume of the influent.

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